Women on Boards:
Does Corporate Culture Influence Board Gender Diversity?

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ABSTRACT

We examine the link between corporate culture and the company's willingness to appoint women to the Boards of Directors. We proxy corporate culture by how companies communicate with investors in the 10-K filings. Our findings provide persistent evidence for a causal link between competitive and collaborative corporate culture and board gender balance. Companies characterized by a high degree of competing culture tend to appoint fewer female directors, consistent with the stylized fact that women shy away from competition. Companies with a high degree of collaborative culture appoint on average more women to their Boards. Companies that score high on collaborative culture, care about achieving goals as a team and long-term human development are likely to be genuinely interested in appointing female directors because they oftentimes have more than one woman on the Board. We also show that, in line with tokenism theory, companies characterized by a less collaborative (more competitive) culture are more likely to appoint female directors only to 'tick-the-box' rather than to truly benefit from board gender diversity. We use a dynamic approach to address the reverse causality issue and show that female directors have the potential to affect corporate culture only when they constitute a critical mass in the board.

Keywords: Board of directors, corporate culture, gender diversity, board diversity, women on board.

JEL classification: G00, G34, J16, J20, M14.

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I. Introduction

Diversity, equity, and inclusion are increasingly emphasized in the corporate missions, strategies, and practices; replacing the once-famous 'greed is good' type of statements. In the space of corporate governance, diversity is becoming a mantra. There is a strong interest in increasing the presence of women in business, particularly in corporate Boards of Directors (hereafter, 'Boards' or 'BoD'). Firms benefit from increasing female representation because women can bring different values to the table (Robinson and Dechant, 1997), increase financial value Carter et al. (2003), or improve board decision-making processes (Joecks et al., 2017). In recent years, several initiatives aimed at boosting board gender diversity among organizations have been launched. In the US, in 2019 women held more than 20 percent of the board seats at the top 3,000 publicly-traded companies (Batish, 2019). This is a material improvement, yet it is still below the levels in other countries, especially those with an obligatory minimal quota (e.g. Norway). In private US companies, the situation is even worse. In 2019, only 7 percent of board seats were held by women, while 60 percent of companies did not have a single woman on the board (Teare, 2019). As much as female underrepresentation on boards and in executive positions is a stylized fact, Adams urges that we still *"know very little about the causes of female relative underrepresentation on boards. One important reason why we need more research on this topic is that the causes of underrepresentation are likely to affect how important selection is and, as a result, gender gaps in director preferences. If gender gaps vary across different types of firms and countries, the impact of board diversity may also vary across different types of firms and countries."* (Adams, 2016)

We investigate whether corporate culture (hereafter, 'CC') is the cause of women's underrepresentation on the Boards of Directors. We adopt the definition of corporate culture as shared organizational values, beliefs, principles, attitudes, and other intangible structures (Hofstede, 1980), and we treat it as a demand-side factor in the board member's market. Specifically, we explore whether firms characterized by a certain corporate culture are more likely to appoint female directors. Hereto, we follow ten Have et al. (2009) and distinguish four CC types: collaborative, creative, competing, and controlling. Any company displays traits of each CC type, but to a different degree. We hypothesize that the degree of CC types in a company will predict higher women's representation in their BoDs. Our prior is motivated by cases from business practice, where var-

ious realizations of corporate culture led to specific director appointments or removals from the board. For instance, WeWork, a company characterized by aggressive growth and with a reputation of being target-oriented, appointed the first woman to its BoD only because it was severely criticized for having an all-male board when it filed for an IPO (Hussain, 2019). At the same time, the company was being sued by its multiple former employees for gender discrimination, who described WeWork's corporate culture as "bizarre, seemingly driven by the whims and quirks of its founders, that's only likely to heighten concerns about the fast-growing office-sharing company" (Bort, 2019). Daejan, one of the oldest public property companies in the UK, has been suffering years of criticism of its poor corporate governance because its main shareholder, who follows a strict Orthodox Jewish culture, has been objecting to appointing women to its board. Recently, the company announced that it would rather go private than change its practice (Thomas, 2020). Practical motivation comes also from a pool showing that 63% of Americans believe a company's culture plays a major role in the women's appointments to top corporate positions. Another insight from this study suggests that 79% of Americans believe certain cultures (e.g., the attitude of men so-called 'boys club' sentiment) make it "hard for women to get ahead" Rockefeller Foundation and Global Strategy Group (2017).

We exploit a firm-level dataset on corporate culture spanning firms that belong to the S&P1500. There is very little empirical work on corporate culture because culture is very difficult to measure. Most studies in this space use data derived from interviews, questionnaires, and other sources based on declarations rather than actions. We approach this challenge differently. We form corporate culture measures using a bag-of-words model in the process of a textual analysis of the 10-K filings. Specifically, we create dictionaries of words describing each type of corporate culture and estimate the intensity of each CVF culture in the management's perceptions embodied in the 10-Ks. This technique follows the growing literature that utilizes textual analysis to discover the latent attributes, values, and norms governing firms. At the same time, using CC measures based on companies' formal communication with the market ensures objectivity and eliminates falsely positive statements, often observed in survey-based datasets. Then, we build a sample of 18,160 firm-year observations of the 1993 firms, for which we marry the data on their board composition with the measures of each CC type.

Our main empirical exercise models women's representation in the boardroom with variables

describing corporate culture. In the univariate analysis, using the means in quantiles analysis, we show that companies characterized by a high degree of a collaborative culture tend to appoint more female directors. Conversely, firms with higher creative, controlling, and competitive cultures have fewer female board members. In the multivariate analysis, we report that a women's representation on the BoD is positively associated with the degree of the collaborative culture, while higher women's underrepresentation is observed in companies with a higher degree of competitive culture. This is in line with both our prior and findings from previous studies, especially in the field of organizational behavior, philosophy, and sociology.

Establishing a causal relationship between corporate culture and board gender diversity poses a challenge mainly because of the endogenous nature of corporate boards and their characteristics. Board members are chosen by companies to match their operating environment and philosophy (Adams and Ferreira, 2007; Harris and Raviv, 2008). The concern is that the direction of causality between CC and women's representation in the boardroom is *ex-ante* unclear. Aside from corporate culture influencing board appointments, there is a theoretical possibility that female directors affect the firm's practiced values. Female board members may adopt different policies, establish new corporate communication styles and channels, promote new values, or revamp corporate strategy. By doing so, they reshape the corporate culture. To address this concern, we conduct checks that provide empirical support for the causal link between CC and board appointments. First, in our original model specification, we lag the CC variables up to 3 periods back in time and report that each time past realization of corporate culture is linked to the contemporary board gender diversity. Second, to strengthen our argumentation about the direction of the causal effect, we test whether contemporary changes in women's representation on the BoD were preceded by changes in each type of CC. We report the explored link to be statistically and econometrically significant. Third, we use a dynamic approach to CC to check whether the firm's culture can be explained by the board composition. We document that the contemporary level (changes) in corporate culture is associated with the past realization of this culture but not with the contemporaneous and preceding board gender diversity (or changes therein). Interestingly, we find that female directors have the potential to attenuate competitive and creative culture in an organization but only when there are three or more female directors. This finding is in line with Kanter's (1977) critical mass theory. Against this backdrop, while we embrace endogeneity,[1] we show that there exists a strong and

persistent relationship between corporate culture and the appointment of female directors because our claim survives all performed robustness tests.

Finally, we explore whether companies characterized by a low (high) degree of collaborative (competitive) culture are willing to appoint only one woman on their boards to 'tick-the-box' of increased public demand for diversity at the workplace and in the boardroom. We are inclined to think that firms genuinely interested in diversity and characterized by a high degree of collaborative culture do not treat women as tokens and are more eager to have two and more female directors. Our tests confirm the tokenism hypothesis and show that the probability of appointing a second woman to the BoD decreases once there is already one women director in a company. We also find that this probability decreases less in companies characterized by strong collaborative culture, therefore we argue that such companies appoint female directors because they are truly interested in the values women bring to the BoD, while companies that score low on the collaborative culture (and high on the competitive culture) appoint one female director mainly for the reason of 'window-dressing'.

Together, our evidence implies that corporate culture, especially its collaborative and competitive dimensions, has a first-order effect on appointing women into the boardroom. We propose a solution to at least partially address the gender disparity in the Boards of Directors. We argue that board gender diversity can be increased via internal actions aimed at reshaping the company's practiced culture towards a more collaborative and human development-oriented one. This solution can serve both as a substitute and complement to exogenous treatments introduced to increase board gender diversity (like gender quotas).

We make two main contributions to the literature. First, we take part in the active academic debate on gender diversity in leadership positions. One strand of the broad literature emphasizes the influence of women's preferences and choices on corporate management, policies, and performance (Adams et al., 2011; Adams and Ferreira, 2009; Adams and Funk, 2012; Ahern and Dittmar, 2012; Bøhren and Staubo, 2016; Carter et al., 2003; Eckbo et al., 2016; Faccio et al., 2016; Ferreira, 2015; Huang and Kisgen, 2013; Matsa and Miller, 2013; Tate and Yang, 2015). These studies suggest that given women-specific traits and preferences (e.g., female overconfidence, greater risk-aversion, stakeholder-orientation, etc.), women's representation in boards and top managerial positions can affect corporate outcomes such as firm value, asset growth, leverage, debt issuance, the likelihood of making acquisitions or pursuing more favorable policies for employees. These studies, however,

center only around the implications of women's presence in corporate management and oversight. Conversely, a growing body of literature takes a step back and investigates the causes of appointing so few women to the top management positions and the Boards of Directors. Adams et al. (2016) find that certain family circumstances and values discourage women from working as financial professionals. Gneezy et al. (2003) and Niederle and Vesterlund (2007) associate the low representation of women in management with their lesser lust (predisposition) to compete. Studies with a focal point on the determinants of women's representation in the boardroom are most directly related to ours (Adams and Ferreira, 2009; Apesteguia et al., 2012). However, these causes of women's underrepresentation stem from the supply side. Little has been known, so far, about the causes of appointing so few women to boards that stem from the demand side. Our study addresses this gap by exploring whether corporate culture operates as a demand-side factor affecting board gender diversity. We contribute hereto by providing empirical evidence that a high degree of collaborative culture can have enticing power to bring more women into board positions while a high degree of competitive culture can play a pivotal role in creating women's underrepresentation in the BoD.

Second, we contribute to a small but growing literature that explores how corporate culture affects corporate outcomes and governance. Aguilera and Jackson (2003) and Lubatkin et al. (2007) show that variation in institutional environment (that comprises culture) leads to differences in governance structures. Fiordelisi and Ricci (2014) provide evidence that different types of corporate culture influence CEO turnover. Firm culture also affects corporate outcomes. Grennan (2013) documents that corporate culture is a channel through which a company's governance affects firm value. More recently, using an interview/survey method, Graham et al. (2017) report that 91% of American executives believe in a causal link between culture and firm value and provide evidence that links culture to ethical choices in the company around compliance or short-termism, to innovation (e.g., risk-taking), and value creation. In this paper, we provide empirical evidence that corporate culture proxied by management communication in the 10-K filings (otherwise unobservable) plays a pivotal role in how the companies address gender diversity issues in board appointments. Admittedly, business has already been calling for closer attention to corporate culture because it is "often the biggest driver of diversity and inclusion" (Mehnert, 2020). However, to our best knowledge, this is the first empirical study that links women's underrepresentation in the Boards of Directors with corporate culture.

The rest of our paper proceeds as follows. Section II presents our hypothesis grounding them in the related literature. Section III describes our data and descriptive statistics and Section IV presents results. Finally, we conclude in Section V with some thoughts on the implications of our findings.

II. Hypothesis Development

Scholars have been searching for explanations of why some companies appoint more women to the BoD than other companies. Several scholars argue that woman representation is related to the supply-side factors, pointing to motherhood (Bertrand et al., 2010) or female preferences and psychological factors (Adams, 2016; Adams et al., 2016; Adams and Funk, 2012). Specifically, women are more risk-averse than men and shy away from competitive situations (Bertrand, 2011; Croson and Gneezy, 2009; Niederle, 2014). Against this backdrop, it is somehow natural to expect that since women have specific characteristics and values, they would be more eager to work for companies characterized by a certain corporate culture (e.g., for firms with a culture of lower risk-taking). Other scholars marry the supply side factors with the demand side drivers and seek to explain board diversity referring to the so-called self-selection when firms and executives select each other based on the company's characteristics and individual preferences. To this point, for instance, a company that leans towards avoiding excessive risk could be more inclined to appoint more female directors because women fit their risk-averse approach better. At the same time, women who tend to be more risk-averse than men might be less eager to work for an employer that bets big on risky projects with a greater reward while being more attracted by companies that emphasize human collaboration and team work. In this spirit, Faccio et al. (2016) find that CEO gender is negatively associated with the level of corporate risk-taking. Also, women are less represented in small firms (Adams, 2016) that usually have a more aggressive growth profile. Following such reasoning, we suspect that corporate culture might be another determinant of why companies are not equally willing to appoint women to their BoDs.

To operationalize corporate culture, we rely on the competing values framework (hereafter, "CVF") that has been named as one of the forty most important frameworks in the history of business (ten Have et al., 2009). The CVF framework classifies firms' corporate values into four

cultures. First, it differentiates between corporate values that emphasize an external orientation from those that focus on internal capabilities: the so-called *external-internal domain*. Further, it distinguishes between corporate values that emphasize effectiveness criteria that focus on flexibility and discretion from those that are centered on stability and internal control: the so-called *flexibility-stability domain*. These two dimensions intersect to define four distinct types of corporate cultures that comprise the CVF, namely: COLLABORATE, CREATE, COMPETE, and CONTROL (Figure 1).

[Place Figure 1 about here]

Given the firm characteristics represented by the CVF types of corporate culture, we hypothesize that women representation in BoDs varies across the companies characterized by different degrees of the four CC types. There are no theories directly applicable to our hypotheses. [2] Therefore, we are mostly building our predictions upon empirical finings and overarching arguments related to gender differences: for a company characterized by one of the CC types, a woman can make a better/worse match, on average, as the desired board member. Therefore, the inclination to and the realization of appointing female directors vary across the CC types. Specifically, we expect two causal relationships.

A. Women vs. Collaborative Corporate Culture

First, collaborative culture focuses on its employees and attempts to develop human competencies and strengthen organizational culture by building consensus. The underlying logic is that human affiliation produces positive affective employee attitudes directed toward the organization. The goal of this culture is to develop cooperative processes and attain cohesion through consensus and broad employee involvement, e.g., clarifying and reinforcing organizational values, norms, and expectations, developing employees and cross-functional workgroups, implementing programs to enhance employee retention, and fostering teamwork and decentralized decision making. To this point, companies with a high degree of collaborative culture usually succeed because they hire, develop, and retain their human resource base. They also seek leaders who are facilitators, mentors to others, and teambuilders. In this spirit, we expect such culture to be more welcoming to women who are characterized by values that are important for collaboration, are oriented at others and

their well-being, and create an environment that fosters growth and development of everyone, not only themselves.

Our prior is firmly grounded in psychology and sociology. Research in these fields indicates that there are material and (often) persistent gender differences in values. Based on the Schwartz Value Survey, Schwartz and Rubel (2005) find that women attribute more importance to benevolence and universalism than men. Hereto, universalism aims at "understanding, appreciation, tolerance, and protection for the welfare of all people and nature", and is practiced primarily through social justice, equality, and wisdom, while benevolence means "preservation and enhancement of the welfare of people with whom one is close", and is fulfilled by being helpful, caring, loyal, supportive (Schwartz, 1992). More recently, Falk and Hermle (2018) report that globally women are more prone to altruism and positive reciprocity than men. These values, reported in two independent studies, seem very close to the description of the collaborative culture, as they are focused on the group, community of people rather than individuals.

Taylor and Wolfram (1968) argue that the virtues, one has, can be either self- or other-regarding. The former benefit the one who possesses them, the latter benefit others. They name generosity, conscientiousness, honesty, veracity, and justice as examples of other-regarding virtues (Taylor and Wolfram, 1968). When Beutel and Marini study the measures of value orientation, they show that the top three are "(1) compassion, which reflects concern and responsibility for the well-being of others, (2) materialism, which reflects emphasis on material benefit and competition; and (3) meaning, which reflects a philosophical concern with finding purpose and meaning of life" (Beutel and Marini, 1995). They provide empirical evidence that females are more compassionate, that is more likely to express concern and responsibility for others' well-being, than males (gender explains over 13 percent of the variance in compassion). This implies that women have stronger other-regarding preferences and values. Additionally, Beutel and Marini (1995) suggest that other-regarding, also called pro-social, virtues and preferences mean that an individual internalizes the utility of others in society. Thereupon, we are inclined to think that the same applies to the business environment of a company. In companies characterized by a high degree of collaboration, we expect a certain preference for appointing directors and managers who are other-regarding because with a strong female leadership such companies are more able to develop human competencies, retain employee base, foster teamwork, etc.

Further, the goal of a collaborative culture is to develop cooperation and attain cohesion through consensus. In an organizational context, to achieve this goal, one often needs to negotiate and have a sense of agreeableness. Regarding the need to negotiate, a stream of literature provides arguments that there are gender differences in the negotiation style and conduct. Bowles et al. (2005) provide evidence that women negotiate more effectively for others than for themselves. This can be driven by regarding others. Bertrand (2011) posits that women may either feel more obligated towards others or simply care more about others. When responsible for the interests of others, women feel more empowered and motivated to do better in negotiations. Alternatively, this can be driven by a fear of repercussions when women negotiate for themselves, as it has been demonstrated that women are more probable than men to experience a social backlash when self-promoting (Rudman, 1998; Rudman and Glick, 1999). Resultantly, female employees express a lower propensity to negotiate on behalf of themselves (Greig, 2008). Women also tend to be intimidated by the 'negotiation' language. That is another reason why they are less likely to initiate negotiations. However, they perform significantly better when they deal with issues using 'asking' language (Small et al., 2007). This, in turn, is in line with the collaborative culture. Regarding agreeableness, Bouchard and Loehlin (2001) and Mueller and Plug (2006) suggest that women are consistently found to be more agreeable than men, with the gender gap in this trait being the largest among all other personality traits. This has several potential outcomes for the company. For instance, Adhikari et al. (2019) report that firms, where women have more power, appear to reduce litigation risk. This could mean that women prefer to create consensus and approach issues rather in a collaborative than in a battling manner. Eventually, in line with the conventional view, Joecks et al. (2017) report that women directors often act as mediators between different perspectives and opinions, which can contribute to the cohesion and doing things together.

Another supporting argument comes from the area of the board members' desired competencies. Numerous studies present evidence for the importance of personal networks with the CEO, other CEOs, and other board members as one of the key (often second most important) qualification necessary for a woman to be appointed as a board member (Burke, 1997b,a; Dunn, 2012; Nekhili and Gatfaoui, 2013; Peterson and Philpot, 2007). Further, women need to be more active in social networks and socialize more with recruiting agents than men if they want to maintain the same probability of being hired/appointed (Bjerk, 2008). Including the criterium of network relations

within the company (personal links to executives and board members) and external business contacts (with other executives and boards) for women in the process of hiring a woman to the BoD is often seen as a way shareholders try to mitigate the uncertainty of a female candidate's actual competencies. However, we suggest an alternative explanation: network relations are an indication of the capability to collaborate with others.

AAs collectivistic or non-individualistic societies express more sensitivity towards minority representation in decision-making positions (Schuler and Rogovsky, 1998), these societies tend to have more gender diversity on the BoDs (Carrasco et al., 2015). In our micro setting, we are inclined to think that companies characterized by collaborative culture are more eager to appoint women to their BoDs. The above overarching arguments and findings from previous studies allow us to state the following hypothesis:

H1. *Companies with a strong tendency towards a collaborative corporate culture appoint more women to their Boards of Directors.*

Failure to reject this hypothesis suggests that collaborative corporate culture is women-enticing as it welcomes them in the director positions.

B. Women vs. Competitive Corporate Culture

Second, the competitive culture (which is the 'opposite' to collaborative) speaks about the elements that drive the firm to beat competitors and cater to market expectations. This type of culture focuses on the organization's external effectiveness by pursuing enhanced competitiveness and emphasizing organizational effectiveness, fast response, and customer focus. These companies usually attach the highest priority to customers and shareholders and judge success based on such indicators as market share, revenues, meeting budget targets, and profitability growth. They seek leaders who are hard-drivers, competitors, and producers. Against this backdrop, we expect this culture to be less welcoming to women given that women, on average, are more risk-averse, perform worse in highly competitive situations, and value others more than targets and material rewards.

Commencing with the findings from the field of psychology and sociology, men attribute more importance than women to power, stimulation, hedonism, achievement, and self-direction values

(Schwartz and Rubel, 2005). As already mentioned, women are associated more with other-regarding, while men more with self-regarding virtues. Among the examples of self-regarding virtues, Taylor and Wolfram (1968) name foremost courage and industry. These virtues and values are close to the competitive culture where one needs to take brave actions to outpace the competitors, remain focused on the targets, be productive and not waste any time on issues unrelated to the main goal. Beutel and Marini (1995) deliver direct evidence that males are more accepting of materialism and competition than females (gender accounting for 8.6 percent of the variance in the materialism construct). Further, Pratto et al. (1997) conclude that men are more social dominance-oriented than women. Rustichini contends that "competition is the product of the desire for dominance, rather than the artificial output of social arrangements" (2008). Therefore, we are inclined to extend the tendency of men having a greater desire for social dominance than women to their greater desire for dominance in business, which then results in environments characterized commonly by fierce competition.

Greig (2008) runs a behavioral experiment not only to provide evidence that men negotiate more for themselves but also to find that employees with the propensity to negotiate are promoted remarkably quicker. She concludes this is the cause of women's underrepresentation in senior positions. We expect that in strongly competitive environments, where one needs a tougher negotiation style, this mechanism would be even more evident and lead to prioritizing men in board appointments. Accordingly, in companies with a stronger competitive culture women will be more underrepresented in the BoDs.

Importantly, women tend to perform worse when competition becomes fierce. Gneezy et al. (2003) provide experimental evidence in support of women being less effective than men in competitive environments, even if they can perform similarly in non-competitive environments. Niederle and Vesterlund (2007) examine whether men and women of the same ability differ in their selection into a competitive environment and report that women shy away from competition and men embrace it. Ors et al. (2013) add stress element to the testing environment and show that women perform more poorly than men in a stressful and competitive situation (entry exam to HEC with very low admittance rate) than in a more 'neutral' situation (courses taken in the first year of studies).

Competitiveness is closely linked with risk-preference, which is an innate personality trait,

largely unobservable. Hereto, there is strong empirical evidence that risk preference level is linked to gender. Falk and Hermle (2018) report that globally women are less risk-taking by 0.168 standard deviations. Women are less likely to be involved in 'risky experiments', 'intellectual risk-taking,' and 'gambling' than men (Byrnes et al., 1999). More specifically, several studies related to investment and gender differences showed that female investors invest more conservatively (Johnson and Powell, 1994; Sunden et al., 1998). Evidence closer to our study shows that women in senior corporate positions adopt safer policies (Faccio et al., 2016; Francis et al., 2015), exhibit less overconfidence in decision-making with a financial component to it (Estes and Hosseini, 1988), and are more compliant with company's rules and legal regulations (Bernardi and Arnold, 1997; Beu et al., 2003; Fallan, 1999). (Croson and Gneezy, 2009) conduct another literature review and suggest that gender differences in risk aversion might be explained by the stylized fact that women exhibit a different emotional or affective reaction to risk, as they experience more stress, fear, and dread in situations that involve the risk of a negative outcome (Fujita et al., 1991). Often, they even overestimate the probability of a negative outcome (Flynn et al., 1994). Companies overseen by such directors might be taking less risk, but they also might miss out on business opportunities. It often entails risk-taking, even going beyond the rules, to win new markets and customers. Women directors are, on average, less eager to do so. Indeed, Adhikari et al. (2019) provide indirect empirical evidence that female directors and competitive companies do not go hand in hand. Specifically, they show that firms, where women have more decisive power, face fewer lawsuits, partly because they do not implement risky but value-increasing firm policies.

Last but not least, Niederle and Yestrumskas (2008) argue that women avoid higher difficulty levels on a task, even though there are neither gender differences in ability on that task nor gender differences in beliefs about ability on that task. They show that these material and significant gender differences in the willingness to select more difficult tasks can be fully explained by gender differences in risk aversion and confidence. They conclude that women's lower desire to seek challenges is the cause of their underrepresentation in high profile occupations. Along these lines, we are inclined to believe that this is also the reason for fewer women directorships in highly competitive firms.

Against this backdrop, we anticipate that competitive culture favors men who are more aggressive risk-takers and is less welcoming to women. Adams and Funk (2012) hypothesize that the degree of risk aversion in women may decrease once they have made it to the top positions in the

corporate world and have adapted some of their personality traits to the male-dominated environment. Even if that were true, we still expect companies characterized by a strong competitive culture to be less open to female directors because their shareholders feel more confident when they put male directors in charge of having things done (market share, revenues, profitability, growth, and other targets). Therefore, we state the following hypothesis:

H2. *Companies with a strong tendency towards a competitive corporate culture appoint fewer women to their Boards of Directors.*

Failure to reject this hypothesis suggests that competitive corporate culture is women- discouraging as it appoints them less often to the director positions.

We do not develop analogous hypotheses regarding the creative and controlling corporate cultures in the CVF framework because, based on the cultures' attributes, it is difficult to form clear predictions regarding their influence on women's representation. Hence, for these CC types, we leave the data to speak.

III. Data and Descriptive Statistics

A. Data and Measurement

We run our analysis on a sample of 1993 firms that were included in the S&P 1500 between 1997-2016. They represent almost 90% of the total US market capitalization. Our data set draws from several data sources. We obtain annual firm-level data from Compustat. To map/measure corporate culture through the textual analysis, we obtain each firm's 10-K filings from the SEC's Edgar database. Women representation on the BoD and other corporate governance data we derive from the ISS (formerly RiskMetrics) which provides board data for the universe of S&P 1500 firms. Execucomp database provides data on the firms' executives, their personal characteristics, and compensation, etc. It also reports compensation data for the five highest-paid executives of S&P 1500 firms. We run a robustness check to verify whether our results are driven by the corporate culture and not by the pipeline of women executives within the company that can be appointed to the BoD.

There is very little empirical work on corporate culture because culture is very difficult to measure. Most studies are based on interviews, questionnaires, and other sources based on declarations rather than actions. We, conversely, take a different approach and measure corporate culture using a bag-of-words model in a textual analysis of company's formal communication, as in **?**. To operationalize CC, we rely on the competing values framework (CVF) that has been named as one of the forty most important frameworks in the history of business ten Have et al. (2009). Theoretical underpinnings thereof are founded on the work of Quinn and Cameron (1983), Quinn and Rohrbaugh (1983) and Cameron et al. (2014). Specifically, we exploit the textual information from a large corpus of 10-K filings describing the current and future operations of firms to measure management's perceptions of the intensity of each CVF culture. This measurement technique follows the growing literature that utilizes textual analysis to discover the latent attributes, values, and norms governing firms (Bushman et al., 2016; Fiordelisi and Ricci, 2014; Hoberg et al., 2014; Hoberg and Phillips, 2016, 2010; Li, 2010a,b; Li et al., 2013; Loughran and McDonald, 2011, 2013; Tetlock, 2007). We estimate the four cultures as theorized under the CVF, namely COLLABORATE, CREATE, COMPETE, and CONTROL culture, by parsing 10-K filings using bags of words suitable to capture aspects underpinning each culture. Specifically, we create four bags of words comprised of various lexical items that best describe the corporate cultures as theorized by the CVF.[3] The development of the bag of words follows is achieved by a four-step procedure that minimizes subjectivity in the selection process. First, we select certain keywords as suggested by the instruments/questionnaires used to identify corporate values associated with the four cultures. Second, all words selected in the first step are looked up in the Harvard IV-4 Psychosocial Dictionary to identify other relevant synonyms. Third, we account for suffixes (forming grammatical and derivational variants of the same word) by reducing these words to their stemmed form. This helps to ensure that when we conduct the word search in the 10-K filings, we count all variants of words that make up the corresponding bag of words. The bags of words with all words used to parse the 10-K filings are listed in Appendix A. Four, following the above logic, we count the number of occurrences of the keywords in each bag and then remove any case where "no", "non", "not", "less", "few" or "limited" precede precedes the word by four or fewer words. Like prior studies in the area, to control for 10-K length, we scale the number of related words by the total number of words in the 10-K. The resulting CVF cultures are:

$$COLLABORATE = \frac{\#\ words\ describing\ the\ collaborate\ culture}{Total\ \#\ words\ in\ the\ 10-K\ filing} \tag{1}$$

$$CREATE = \frac{\#\ words\ describing\ the\ create\ culture}{Total\ \#\ words\ in\ the\ 10-K\ filing} \tag{2}$$

$$COMPETE = \frac{\#\ words\ describing\ the\ compete\ culture}{Total\ \#\ words\ in\ the\ 10-K\ filing} \tag{3}$$

$$CONTROL = \frac{\#\ words\ describing\ the\ control\ culture}{Total\ \#\ words\ in\ the\ 10-K\ filing} \tag{4}$$

B. Descriptive Statistics

Our analysis is carried out on all firms at the intersection of the Compustat-Edgar-ISS databases, for which we have data on the variables of interest (i.e., culture-related variables, women on board measures, financial and board controls). Following previous studies, we exclude financial services (SIC 6000-6999) and utilities (SIC 4900-4999). The final sample consists of 18,160 firm-year observations. Table I reports the definition of all the variables used in the empirical analysis.

[Place Table I about here]

Table II presents the summary statistics. The dependent and the control variable values are reported for year *t*, whilst the culture variable values are reported for year *t-1*. In terms of the dependent variables, the mean value of WOB(PRC) is 11 percent, while 65.9 percent of the sample firms have at least one woman on board as shown by the mean value of WOB(D). Further, the mean value for the COLLABORATE culture is 0.659 words per thousand 10-K words, while this figure is 0.796, 1.550, and 0.816 words per thousand 10-K words for CREATE, COMPETE, and CONTROL, respectively. Evidently, and according to prior studies Andreou et al. (2019); Fiordelisi and Ricci (2014) COMPETE is on average the most prominent culture. However, unlike the previous studies, the magnitude of COMPETE is not significantly larger than the other three cultures. For example, Fiordelisi and Ricci (2014) report mean values of COMPETE which are more than three times larger than CONTROL and COLLABORATE, and more than four times larger than CREATE. In our case, the mean value of COMPETE is no more than two times larger than CONTROL, and about two times larger than CREATE and COLLABORATE. This disparity is expected since, in our case, the bags of words are developed using a more compact set of words that (better) underpin

the corporate traits behind the CFV theory. Visual illustration of yearly means for each culture and for the mean yearly representation of women on the BoDs is depicted in Figure 2.

[Place Table II about here]

[Place Figure 2 about here]

IV. Results

A. Does Corporate Culture Determine Board Gender Diversity: Univariate Analysis

Table III presents Pearson correlation coefficients between lag 1, 2 and 3 values of the culture variables and the dependent variables. In our empirical approach, we conduct an analysis whereby the culture variables are lagged up to three periods to safeguard that the analysis is not impeded by simultaneous causality issues. By investigating whether past corporate culture attributes can predict future presence of women on board, our analysis (and regression models) is less susceptible in the presence of a contemporaneous feedback mechanism (i.e., reverse causality). Two key observations are in order.

[Place Table III about here]

First, irrespective of the lag period, there are positive and statistically significant relationships between COLLABORATIVE and CONTROL cultures with the dependent variables, while negative and statistically significant relationships between CREATE and COMPETE cultures and the dependent variables. These observations provide univariate support to our hypotheses.

Second, following the CVF theory, the four corporate cultures should substantially persist over time, as a change in this kind of feature is expected to take place slowly (Cameron et al., 2014). Thus, in principle, we should observe persistency across time, something that is reflected in the correlation matrix. For example, the correlation between COMPETE (lag 1) and COMPETE (lag 2) is 0.602, between COMPETE (lag 1) and COMPETE (lag 3) is 0.548 and between COMPETE (lag 2) and COMPETE (lag 3) 0.594. Similar high positive correlation coefficients are observed for the other three culture variables.

Table IV provides another univariate analysis, whereby we independently rank the four culture variables into quantiles on a per year basis. That is, per year and given the values of each corporate culture in period *t-3*, we rank them into five buckets from lowest to highest values, and we repeat this separately for each year (for brevity, we report results with ranks in period *t-3*, yet unreported results with periods *t-2* or *t-1* ranks reveal the same picture). Then, for each quantile we report the mean values for WOB(PRC) and WOB(D). In the bottom of Table IV, we report the differences between the HIGH (5) and LOW (1) quantiles associated with the t-test value. This analysis is complementary to the one presented in Table III since it enables us to better capture the strength and direction of (any monotonic) association between the key variables — rather than the strength and direction of the linear relationship between the key variables as per the Pearson's correlation in Table III.

[Place Table IV about here]

The results from this analysis support a strong positive monotonic relationship between COLLABORATE and the dependent variables, whilst a strong negative monotonic relationship between CREATE, COMPETE, CONTROL and the dependent variables. In principle, three out four of the relationships, the ones between COLLABORATE, CREATE, COMPETE and the dependent variables, appear to be similar based on the results tabulated in Tables III and IV.

Last, but not least, we run univariate regression models with time and industry fixed effects. In Appendix B in Table B1, we report model results estimated with the OLS method, where the dependent variable is the percent of women on the board WOB(PRC) (Panel A) and a dummy WOB(D) (Panel B), respectively. In Table B2, we additionally report logit model results, where the dependent variable is a dummy WOB(D). In all tests, the coefficients are significant and positive for the COLLABORATE culture, while negative and significant for the CREATE, COMPETE, CONTROL cultures, all lagged by one period. Similar results as for the magnitude, also statistically significant, we obtain when we lag the CC measurers by 2 and 3 periods (not reported for brevity). This strengthens our conclusions reported previously in Tables III and IV.

B. Does Corporate Culture Determine Board Gender Diversity: Multivariate Analysis

We examine the previously documented pattern more closely in a multivariate regression framework, developing models that most accurately measure the influence of corporate culture on board gender diversity. The past realization of corporate culture is more meaningful for the current board appointments and enables us to partially mitigate the reverse causality problem. We argue that the dynamic model as per Equation 5 best estimates the relationship between women representation to the BoDs and corporate culture of a company:

$$WOB_{i,t} = \alpha + \boldsymbol{B}\ \boldsymbol{CC_{i,t-1}} + \boldsymbol{\Gamma}\ \boldsymbol{X_{i,t}} + \boldsymbol{\eta}_{i,t} + \varepsilon_{i,t} \tag{5}$$

The dependent variable is a measure of women on the BoD, $\boldsymbol{CC_{i,t-1}}$ is a matrix of variables describing each CC type, while $\boldsymbol{X_{i,t}}$ is a matrix of other determinants of director gender including firm and board characteristics, and $\boldsymbol{\eta}_{i,t}$ is a matrix of fixed effects. Initially, we implement both random-effects and fixed-effects panel estimation approaches, but because Hausman's tests for the hypothesis of no systematic difference in coefficients between these two types of models are always rejected ($p < 0.01$), we only report the fixed-effects estimation results.

Results are reported in Tables V, VI and VII. In all regression models, we include year and Fama and French's (1997) 48 industry dummies to control for the unobserved time- and industry-invariant effects. To mitigate the effects of outliers, all continuous variables are winsorized at the 1st and 99th percentiles. Further, all continuous variables are standardized to have a mean of 0 and a standard deviation of 1. Such standardization is useful to avoid the potentially detrimental effects of scaling differences and allows us to gauge the variables' economic significance directly. However, our results remain unaltered when using unstandardized variables in the regressions. Finally, we rely on the variance inflation factor (VIF) to detect the presence of multicollinearity among the predictors of all the regression models. Unreported results show that the covariates used in our multivariate regression analysis have a VIF that is in principle much lower than 10, which suggests the absence of any severe multicollinearity issues.

The dependent variable in models in Table V is the percentage of women on board, WOB(PRC). The dependent variable in models in Table VI is the dummy variable that takes the value of 1 if there are one or more women on board, and 0 otherwise, WOB(D). These models are estimated

with the OLS method, using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. Additionally, Table VII presents results of models estimated with logistic regression, where the dependent variable is the dummy, WOB(D). In all these tables, regression models (1)-(3) and (4)-(6) feature different estimations with the corporate culture variables measured in periods *t-1*, *t-2*, and *t-3*, respectively. All regression models include a constant, while models (4)-(6) additionally include the associated control variables according to Table I.

The choice of control variables stems from their reported explanatory power reported in prior studies. First, we follow Hillman et al. (2007) and others and we control for both firm and board characteristics with previous evidence of their effect on board composition and 10-K specific controls. First, we include size and age as firm controls. There has been consistent evidence that larger (*size*) and older (*young firm*) firms have more female directors (Hillman et al., 2007; Hyland and Marcellino, 2002) because they are more scrutinized by the broad public. Public pressure for gender diversity makes these companies more inclined to comply with regulations, including soft law guidelines of corporate governance (Dunn, 2012; Farrell and Hersch, 2005), to create a positive image among different stakeholder groups. Second, we include several board controls. Specifically, we add information about the CEO/Chair duality, the percent of independent directors, and the percent of board insiders with an equity share. Given that most CEOs are men, they might be more inclined to push for more men directors to speak the same voice in board meetings, strengthening further the 'boys' club' phenomenon (*CEO/Chair*). Outside directors (*independent directors*) have been found to influence board behavior and might be more welcoming to women. Board insiders with an equity share (*equity insiders*), in turn, tend to care more about the company's financial outcomes, thus might be discriminating against female directors because women are known to affect performance in various ways. Third, we consider the relation between the culture-related words and Loughran and McDonald (2011) sentiment classifications. In untabulated results, we check whether words related to each culture may proxy for some persistent positive or negative tone in corporate 10-K filings, and we find that the overlap of words is minimal. However, given mixed evidence on the correlations of each tone measure with each CC type measure, and to exclude the possibility that board composition is driven by the length (*filing size*) or positive and negative sentiment (*positive tone* and *negative tone*) of the 10-K filing, we control for all these variables in our model specification. Omitted unobserved variables can still hypothetically drive our results, thus

additionally we control for the industry and time FE. The industry is important for the work environment preference argument. The year effects are essential too—including them ensures that the association we study does not simply mirror the economy-wide trend of increasing gender diversity on various corporate levels.

[Place Table V about here]

[Place Table VI about here]

[Place Table VII about here]

Overall, the multivariate analysis reveals two persistent relationships across all models considered, when we do not include firm controls. First, there is a strong positive relationship between COLLABORATE and the two dependent variables (p-values <0.01). Each 1 percentage-point increase in the company's culture towards being collaborative increases the presence of women on the board in the following year by 5.1 percentage-points (Column 1 in Table V), while each 1 percentage-point increase in the company's culture towards being collaborative increases the likelihood of having any women on the board in the following year by 2.8 percentage-points (Column 1 in Table VI). Second, there is a strong negative relationship between COMPETE and the two dependent variables (p-values <0.01). Each 1 percentage-point increase in the company's culture towards being competitive decreases the presence of women in the following year on the board by 5.5 percentage-points (Column 1 in Table V), while each 1 percentage-point increase in the company's culture towards being competitive increases the likelihood of having any women on the board in the following year by 3.7 percentage-points (Column 1 in Table VI). These relationships are confirmed by running a logit model. As per Table VII, companies with a higher degree of collaborative culture/ higher degree of competitive culture are more/less likely to appoint a female director in the following year. Untabulated results of marginal effects are coherent with the results presented in Tables V and VI. Regarding the other two cultures, we do not observe consistent results across the two dependent variables.

In the model specification with all firm, board, and 10-K filing controls (Columns 4-6 in each table), the economic magnitude of the described effects drops roughly by 40% lower. Notably, once we include all controls, the relationship remains equally as significant only for the dummy

WOB(D) variable, while the significance of these two culture types drops to the levels of 5% and 10% for the WOB(PRC) variable.[4] This is not entirely surprising. In the pioneer study of the Board structure determinants, Hillman et al. (2007) provide a gender diversity complement to the resource dependence research, which focuses on occupational and functional differences among directors. They also posit that it is the source dependence theory that suggests using the likelihood of a particular type of director being appointed to a BoDs as a measure in empirical research. Therefore, we primarily focus on differentiating between companies with female representation in their boards and companies with no female directors. We conclude that some corporate cultures are, in general, more/less welcoming to female directors, rather than determining how many women are appointed as directors. Accordingly, we argue that a dummy variable, WOB(D), better operationalizes woman representation in the BoD in our setting.

Several scholars argue that board gender structure is driven by the number (proportion) of women in an organization, particularly of women in top executive positions because successful female executives have high chances of becoming board members in time. Hereto, Adams (2016) ascribes weak woman representation in the BoD to the fact that one in five executives becomes a board member, and while there are more male executives, this infiltrates board composition. Matsa and Miller (2011) point to a reverse relationship: because the main role of a board of directors is to appoint and oversee company's executives, and because women help women in America,[5] the share of women directors in the previous year determines the current share of female executives. To strengthen our baseline inference, we ask the question of whether the pipeline of female executives determines board gender diversity.

[Place Table VIII about here]

Against this backdrop, we test a model as in Equation 5, where we use WOB(D) as a dependent variable. As per Table VIII, we additionally control for the presence of female executives in the period preceding our measure of female presence on the board (Columns 1 and 3), and in the period following our measure of female presence on the board (Columns 2 and 4). Models (1) and (2) are estimated with OLS, while (3) and (4) with logistic regression. We find support for Adam's findings as we see a positive, statistically significant association between the proportion of female executives and the presence of female directors in the following year (p-values <0.01). We also

report strong evidence for Matsa and Miller's findings given that the coefficients are economically and statistically strong for the next period's share of female executives (p-values <0.01). In our sample, the presence of female directors is positively associated with the proportion of female executives in the following year—women seem to indeed help women. Most importantly, when we control for female executives, we still report statistically significant, positive/negative coefficients for the COLLABORATE/COMPETE variables of interest. As per models (1) and (2), the coefficients lose on their magnitude, but a material effect is still there. These new findings strengthen our baseline conclusions that the degree of COLLABORATE and COMPETE culture is associated with the board gender diversity.

Importantly, as one of the biggest issues we are facing is endogeneity, we cannot immediately claim that our results represent causal effects because we do not have valid instruments at hand. According to the academic literature, board characteristics are not exogenous random variables. Rather, they are endogenously chosen by companies to match their environments and preferences. For instance, board characteristics tend to be a function of a firm's scope and its complexity (Coles et al., 2008; Fama and Jensen, 1983). We partly cope with such issues by performing endogeneity checks that allow us to conclude that reverse causality should not be the case here. To this point, in the regressions in Table V, VI, and VII, we lag the explanatory variables of interest by one, two, and three periods.[6] In the subsequent section, we attempt to use other ways of identifying causal effects.

C. Does Board Gender Diversity Shape Corporate Culture: Reverse Causality Check

The literature indicates that board characteristics are endogenous variables because directors are chosen by companies to fit their specific environment and goals. In our sample, the gender of board members is indeed a firm's choice as there are no externalities, like for instance a minimum quota, that affect director appointments in our sample.[7] However, some management and business ethics literature point to the possibility of the opposite effect. Corporate culture can be understood as "a pattern of shared and stable beliefs and values that are developed within the company across time" (Gordon and DiTomaso, 1992). Gibson describes organizational culture as a "both action-guiding and thought-guiding environment" which consists of procedures, policies, goals, norms, and corporate values (2011) that, in line with our hypotheses, could affect director appointments. At

the same time, he perceives the existence of a two-way interrelation between individuals and organizations: "corporations actively participate in shaping a person's moral agency, and hence moral outlook, and, reciprocally, the organization may be shaped by its members through a continuing negotiation of values" (Gibson, 2011). Therefore, they claim that corporate culture and individual behavior may be mutually causal in an organizational context. This observation, however, has not been empirically verified yet. In our setting, this story could be recast through the following mechanism: some companies choose to have more female directors, who then affect corporate culture to be more collaborative and less competitive, while the lack of women on the board reinforces the competitive culture in the organization. Against this backdrop, we need to address the problem of the potential reverse causality. We do it two-fold.

First, we test whether contemporary changes in woman's representation on the BoD were preceded by changes in each type of CC. We test a model similar to the one in Equation 5, but as a dependent variable, we employ the change in woman's representation on the BoD from period *t-1* to period *t*, while explanatory variables are changes in the levels of each CC type from period *t-2* to period *t-1*. We report the results in Table IX.

[Place Table IX about here]

We find that the actual changes in woman's representation on the BoD are indeed preceded by changes in the COLLABORATE and COMPETE culture. This evidence is strong for the collaborative culture. Each 1 percentage-point increase in the company's culture towards being collaborative increases the likelihood of increasing woman's representation on the board in the following year by 1.2 percentage-points ($p < 0.01$). We argue that when a company's culture shifts more towards collaboration, cohesion, participation, communication, and empowerment, these companies appoint more female directors. Our results also suggest there might be a causal relationship between the competitive culture and board gender diversity, but estimates are weaker in statistical significance ($p < 0.1$).[8]

Second, we follow Wintoki et al. (2012) who address the situations of reverse causality issues in corporate governance research. Specifically, they point to the dynamic relation between boards and performance: current values of governance variables (e.g., board structure) are a function of past firm performance (and firm characteristics that proxy for these factors, e.g., firm size,

market-to-book ratio, etc.), but since board structure is a choice variable, then it must be based on some expectations of performance. They suggest that the dynamic nature of the relationship between corporate governance and performance sets up a powerful methodology for identifying the causal effect of governance on performance. Sila et al. (2016) use the same approach regarding the relationship between board diversity and firm risk. We believe that the same logic can be applied to our setting. Considering that we find the COLLABORATE and COMPETE culture influential for board gender diversity, we investigate the possibility of reverse causality.Mimicking the trajectory of thought in Adhikari et al. (2019), we pose a question: if certain corporate culture types affect gender diversity on the board, why do firms with higher COLLABORATE / CONTROL culture appoint more/fewer women as directors? Is it because they want to foster a certain type of CC? We then ask a follow up question whether board diversity affects back the corporate culture. Thereupon, we propose a dynamic model that explains the current corporate culture by its past realization. In the model specification, we include all firm and board characteristics and unobserved fixed effects introduced in Equation 5. Additionally, we include the board structure variable (WOB), with the hope of its insignificance for the current corporate culture, and we run a model as in Equation 6:

$$CC^k_{i,t} = \alpha + \sum_{n=1}^{3} \beta \; CC^k_{i,t-n} + \delta \; WOB_{i,t} + \boldsymbol{\Gamma} \; \boldsymbol{X_{i,t}} + \boldsymbol{\eta}_{i,t} + \varepsilon_{i,t} \tag{6}$$

The dependent variable $CC_{i,t}$ is a measure of the contemporary level of the k type of CC. $WOB_{i,t}$ is the contemporary measure of women on the BoD, $CC_{i,t-n}$ is a sum of the past realizations of the k type of CC, while $\boldsymbol{X_{i,t}}$ represents other determinants of the corporate culture, including firm and board characteristics, while $\boldsymbol{\eta}_{i,t}$ is the matrix of unobservable industry and time heterogeneity. In the models, we include three lags of CC measures (n). The results are reported in Table X.

[Place Table X about here]

In our results, we do not find support for the claim that female representation on the BoD fosters or attenuates a particular type of culture in an organization. The contemporary level of each culture type is strongly dependent on the past realization of this culture, but the coefficient on the presence of women on the BoD WOB(D) remains statistically insignificant and extremely low in economic magnitude (Panel A in Table X). We repeat this exercise using a variable representing the

proportion of women on the board WOB(PRC). We find an almost identical outcome: none of the coefficients on the proportion of female directors is statistically significant, and they are too small to have any economic impact on the level of any type of corporate culture. We only report the former results because we previously argued that WOB(D) better operationalizes woman's representation in BoDs. We also investigate whether our findings hold when we lag the variables describing gender diversity. In untabulated results, we find that the proportion and presence of women on the board, even up to three years back (*t-3*), did not affect the current level of the corporate culture. This enables us to conclude that the contemporaneous and lagged presence of female directors is not immediately related to the level of each type of corporate culture in an organization.

In another model specification, we adopt an approach even closer to the one in Sila et al. (2016). We test a model like the one in Equation 6, but as a dependent variable, we employ the change (increase or decrease, depending on our previous findings) in each CC type from the period of *t-1* to the period *t*. Specifically, we use a dummy that takes a value of 1 when we observe an increase (decrease) in the level of COLLABORATE (CREATE, COMPETE, CONTROL) culture, and 0 otherwise. Similarly to the previous analysis, we add an explanatory variable that is a change in woman's proportion on the BoD (Panel B in Table X) or a dummy that takes a value of 1 if there was an increase in woman's representation on the BoD, and 0 otherwise (untabulated for brevity). Our results again suggest that an increase in the women's representation on the BoD does not result in any subsequent change in the corporate culture.[9]

Additionally, we follow Schartz-Ziv's (2017) view that the impact of gender resembles a step function, i.e. only once a certain minimal threshold of gender diversity is reached, gender balance affects team or board productivity. This perspective is grounded in Kanter's (1977) critical mass theory, according to which a team is gender-balanced when minority gender members comprise at least 35% of a team. Only then gender diversity enhances team performance because minority gender members are not reduced to symbolic representatives of their social category. Against this backdrop, as an additional check of the economic predictions about the culture-gender balance link, we run previous tests, additionally distinguishing between firm-year observations with three or more and less than three female board members. The results are reported in Table XI.

[Place Table XI about here]

We find that when there are at least three female directors, an additional increase in the proportion of women on the board decreases the level of creative and competitive culture (Table XI, Panel A). This is indicative that when women get a critical mass on the board, they can affect culture to be less target-oriented, but also less creative. We do not show, however, any significant effect of an increase in board gender diversity on the level of the collaborative culture. This effect disappears completely in firm-year boards with less than three female directors (Table XI, Panel B), which is in line with the critical mass theory. Noteworthy, we use the threshold of three and more female board members following Shrader et al. (1997) among others, who argue that in board meetings, a critical mass of at least 3 women directors catalyzes board activeness. In untabulated results, we check whether two or more female directors constitute a critical mass enough to change the corporate culture, but we do not see any effect. We conclude that the reverse causality occurs in our setup but only when the board is already gender-balanced, which happens in a mere 1,368 out of 17,010 firm-year observations (Table XI).

These findings contribute to the literature that discusses how board gender diversity affects corporate management, policies, and performance (Adams et al., 2011; Adams and Ferreira, 2009; Adams and Funk, 2012; Ahern and Dittmar, 2012; Bøhren and Staubo, 2016; Carter et al., 2003; Eckbo et al., 2016; Faccio et al., 2016; Ferreira, 2015; Huang and Kisgen, 2013; Matsa and Miller, 2013; Tate and Yang, 2015). We embrace that appointing more women on the board may result in the change of the previously reported corporate outcomes but we also argue that it does not change shared organizational beliefs, social norms, and other intangible structures proxied by corporate communication in the 10-K filings in the short term (except for when boards are already well gender-balanced, in which cases appointing more female directors creates a critical mass that tends to attenuate creative and competitive culture). This can be explained either by the board being too distant from daily corporate activities, therefore it does not affect CC as much as executives do, or by the argument that gender only matters for shaping corporate culture in the long term, which has not been tested here. At the same time, the evidence for the causal link between corporate culture and board appointments remains strong.

D. Tokenism

In recent years, there have been fewer and fewer companies with no women on the board (e.g. Catalyst, 2017, and our findings). Still, we observe that in quite a few companies there has been only one woman on the BoD for many consecutive years. At the same time, it is less frequent to see two, three, or more women as directors. This can be explained by the token theory: "the 'token' board member is seen as representing the 'minority' in general, i.e., in this case women, and they are not considered a board member with broad board competence, to the same extent as other board members" (Kanter, 1977). In practice, this means that having one woman on the board is seen as enough to fulfill the 'expected' diversity on the board. Recent industry evidence implies that tokenism is prevalent. The example of WeWork suggests that when a company with an all-male board attempts to go public, a public controversy can erupt. When filing its registration for an IPO, WeWork noted its 'culture of inclusivity.' Yet, having had published information about its board members all being male, the company faced strong uproar. As a result, the company added one woman to its BoD (Mehnert, 2020).

A few studies link board gender diversity with tokenism. Farrell and Hersch (2005) show that the likelihood of a company appointing a woman to its board is negatively affected by the number of women already on the board; but if a woman leaves the board, it is most likely that she would be replaced by another woman to keep the diversity of the board. Smith and Parrotta (2018) provide evidence that the presence of one woman on board reduces the chances of other women being appointed among the US companies. The same is true for UK firms (Gregory-Smith et al., 2014). Against this backdrop, we continue our investigation hypothesizing that when it comes to competition-oriented companies, they care foremost about immediate performance and results. Thus, such companies strive to have one female director, often only to look good in front of stakeholders. Conversely, collaboration-oriented companies believe that board diversity truly adds value to the company as the board dynamics are different than in an only- or mostly-male board. This is in line with empirical evidence that female directors' behavior affects other board members (Adams and Ferreira, 2009), impacts male directors, and ultimately decisions of the board (Huse et al., 2009). Thus, such companies often appoint more than one female director. We are inclined to believe that companies with a high degree of the COMPETE culture, which have already proved to

be less welcoming for women, would be more 'tick-the-box' oriented and exhibit tokenism behavior more. Companies with a high degree of the COLLABORATE culture should, in line with our prior, be more genuinely interested in having female directors on the board, thus will not be as susceptible to tokenism.

To verify our expectations, we first conduct a simple univariate analysis. We independently rank the four culture variables into quantiles on a per-year basis. That is, per year, and given the values of each corporate culture in period t-1, we rank them into five buckets from lowest to highest values, and we repeat this separately for each year. Then, for each quantile, we report the mean values for WOB(number), which is the number of women appointed to the BoD, conditional on at least 1 female director being on the board already (Table XII). At the bottom of the table, we report the differences between the HIGH (5) and LOW (1) quantiles associated with the t-test value.

[Place Table XII about here]

The univariate analysis yields a takeaway in line with our previous conclusions: when a company scores higher on the collaborative culture, there is a higher probability of having more than one woman on the BoD. Specifically, in the subsample of companies with a not all-male board in the year *t-1*, companies in the lowest COLLABORATE quintile have on average 1.56 female directors in the year *t*, while companies in the highest COLLABORATE quintile have on average 1.65 female directors in the year *t*, the difference being statistically significant ($p < 0.01$). An opposite tendency we see for the number of female directors along the COMPETE quintiles: the higher the degree of the competitive culture, the fewer women on the board on average.

Then, we run a multivariate model that explains the probability of appointing one more woman onto the BoD conditional on the number of women on the board in the previous year, as in Equation 7:

$$Pr(\Delta WOB(number) > 0) = \alpha + \sum Token^{k}_{i,t-1} + \mathbf{\Gamma}\ \boldsymbol{X_{i,t}} + \boldsymbol{\eta}_{i,t} + \varepsilon_{i,t} \tag{7}$$

The left-side variable is a dummy that takes a value of 1 when we observe an increase in the number of female directors, and 0 otherwise. The key right-sight variable, $\sum Token^{k}_{i,t-1}$, indicates

whether there were at least one (*k=1*), two (*k=2*), or more than two (*k=3*) women on the board of directors in the preceding year. In the model specification, we include all firm and board characteristics ($\boldsymbol{X_{i,t}}$), and unobserved fixed effects ($\boldsymbol{\eta}_{i,t}$)) introduced in Equation 5. Additionally, following Smith and Parrotta (2018), we control for the board size, which in the current setting is no longer a part of the dependent variable. The results are reported in Table XIII.

[Place Table XIII about here]

Building on Smith and Parrotta (2018), if the token hypothesis shall not be rejected, we must report significantly negative coefficients on the token indicators, and possibly observe an increase in the numerical size of the estimate along with the increase in the number of board seats taken already by female directors in the previous period. First, we run the model on the full sample of our observations and confirm the token theory: the coefficients on token indicators are negative and grow negatively in magnitude, the more female directors there were in the year preceding an increase in female directors. As per Column 1 in Table XIII, having a female director last year is related to a decrease in the probability of having at least one more woman on the board in the current period by approximately 9 percentage points. The relation doubles in magnitude (is 2.5 times larger) if we consider cases of two (more than two) women on board at *t-1*. All estimates are statistically significant at the highest levels (p-values <0.01). In our sample, in line with previous studies Smith and Parrotta (2018), most companies only try to 'tick-the-box' of having one female director. Because in the univariate analysis, we found that the probability of appointing another woman onto the BoD increases along the COLLABORATE culture quintiles, we run the same model in the subsamples of companies that score lowest (Column 2) and highest (Column 3) on the collaborative CC. We call those companies 'women-hostile' and 'women-friendly', respectively. We find that having already one female director decreases the chance of having one more woman on the board in the companies in the lowest quintile of the collaborative culture more than in the companies in the highest quintile of the collaborative culture. Having already two or more than two female directors decreases the chances of appointing another woman onto the BoD more in the 'women-hostile' subsample than in the 'women-friendly' one. The differences in the likelihood of appointing another female director between the subsamples are quite pronounced in their economic magnitude which makes us believe that the inclination towards tokenism is linked to the company's

culture. All estimates are statistically significant levels (p-values <0.01). We run analogous analysis in the subsamples of the COMPETE culture, and we find evidence for tokenism. However, the difference in the likelihood of appointing another female director between the subsamples are not as pronounced as in case of the COLLABORATE culture. We do not report these results for brevity. Conversely, we run another robustness check where we combine two dimensions of subsampling, and we report them also in Table XIII. Here, we look at companies that at the same time score low on COLLABORATE and high on COMPETE culture (Column 4), and high on COLLABORATE and low on COMPETE culture (Column 5), dividing the companies in each dimension by medians. We again find that the likelihood of appointing another woman onto the BoD, when there was already one, two, or more than two women on the board in the previous year, is lower in the 'women-hostile' type of companies (Column 4) than in the 'women-friendly type of companies (Column 5).[10] This finding strengthens our previous conclusions that companies characterized by a high degree of collaborative culture more often appoint more women onto the board, while companies with a high degree of competitive culture more often appoint female directors only for the window dressing reasons, just like WeWork did in its attempt for stakeholder support in its IPO pursuit.

V. Conclusions

Most of the studies in the space of board gender diversity strive to explain the still relatively small woman representation by the supply-side arguments (Adams et al., 2016; Adams and Funk, 2012; Bertrand et al., 2010). A few studies look at both the supply- and the demand-side factors (Adams, 2016; Faccio et al., 2016). Our study contributes to this discourse by reporting that corporate culture, a demand-side factor in the board-members market, can have a deterministic effect on female directors' appointments.

We show that companies with a high degree of competitive culture are less welcoming to female directors. They create an internal thrust to compete and tend to appoint mostly male board members who do well in a target-oriented environment. Often, they appoint one woman to the board only to 'tick-the-box' of being minority-inclusive. Conversely, companies characterized by a high degree of collaborative culture aim to achieve corporate goals in team spirit and focus on the long-term devedevelopment of their members. Hence, they tend to be more genuinely interested in

appointing female board members who are more capable of creating the environment of doing things together. Corporate culture has been viewed as an integral feature of an organization for quite some time now, as it has proved influential for corporate outcomes (productivity, performance, etc.). We contribute hereto by delivering evidence on the role of corporate culture for the gender gap in board appointments. This should be of interest not only for women seeking director roles but also for shareholders and other stakeholders who wish to benefit from having a diversified BoD. As female directors are known to bring real value to the board's decision-making, we advise shareholders to take a step back and carefully audit who is leading the company on daily basis. It is a stylized fact that these are the executives and other high-level managers who shape corporate culture on daily basis, which is a pre-requisite for increasing female presence on the boards. Lastly, we are inclined to believe that corporate culture has even more potential for narrowing the gender gap in the boardroom in economies with low corporate governance standards (developing countries). We leave this conjecture for future research.

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Notes

[1]A causal link between the level of different CC types in the company and the gender diversity of their boards can be driven by either the firm's culture or individual preferences. On one end, firms characterized more by a certain culture are more prone to appoint female directors. For instance, companies that are target-oriented and cultivate a more competitive environment among employees could be less willing to appoint female board members because of women's lesser predisposition to competition(Gneezy et al., 2003; Niederle and Vesterlund, 2007). Conversely, companies characterized rather by a culture of avoiding excessive risks and putting more emphasis on collaboration may find that women fit their profile (risk-averse culture) better because female directors tend to be more risk-averse than their male counterparts, which brings more balance to the board. On the other end, it is possible that a specific corporate culture has either enticing or discouraging power to attract more women into their boards: women self-select companies they want to be a board member of based on the firm's culture. For instance, cooperation-oriented women chose to work for firms that promote a more collaborative culture and avoid firms that exhibit primarily a competitive culture. These two self-selection processes are non-mutually exclusive. Moreover, both channels can lead to a causal relationship of corporate culture on the board gender diversity. Although the direction of the selection (companies select women vs. women select companies) may be affecting our estimates of interest, determining which of these channels prevails does not condition inferring that such a causal relationship exists from the statistical standpoint.

[2]The closest point of reference is the institutional theory that has been used to investigate on e.g., the presence of women in other levels of company positions (Bilimoria, 2006). Li and Harrison (2008) use this theory to show that culture significantly affects the structure of board directors in terms of insiders and outsider.

[3]We develop a bag of words from the keywords used in a survey questionnaire developed to measure firms' culture through the responses of firms' employees Cameron and Quinn (2011).

[4]We run a mirroring procedure while lagging also all control variables as in Sila et al. (2016). Untabulated results remain unchanged against the reported ones.

[5]For instance, Tate and Yang (2015) show that female leadership cultivates a more female-friendly culture inside their firms.

[6]In the multivariate analysis, we decided to control for non-lagged variables. We have, however, conducted also a mirroring estimation where, to be more conservative (Adhikari et al., 2019), we lagged all control variables. Untabulated results remain mostly unchanged.

[7]The minimal quota has been introduced in counties like Norway or in the US state of California, where many of the S&P 1500 companies are headquartered (Greene et al., 2020). Our sample encompasses US public companies, but it finishes in 2016, while California's minimal quota has been introduced in 2018, so none of this applies.

[8]We estimate this model using OLS regression, but our result is robust to logistic parametric estimation.

[9]For robustness, we run analogous analysis using logistic regression and we report results in Table B3 in Appendix **??**. Results remain unchanged.

[10]In untabulated results, we repeat the analysis estimating logistic regressions, and we obtain similar results.

Figure 1. Four types of corporate culture accrding to the CVF. More description needed.

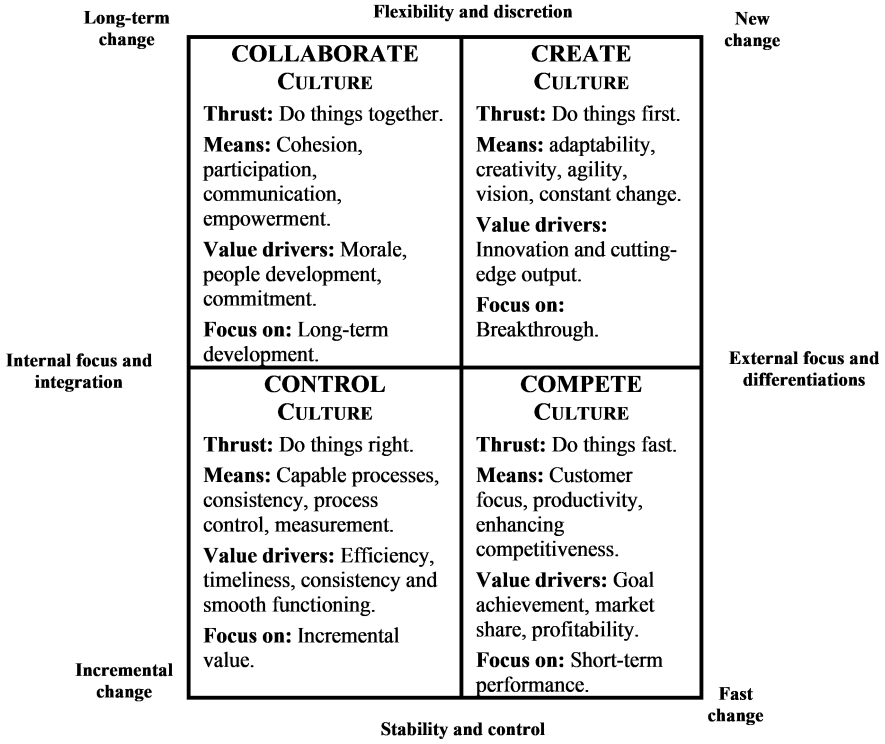

Figure 2. Yearly means of each CC type & fraction of WOB, 1997-2016.
More description needed.

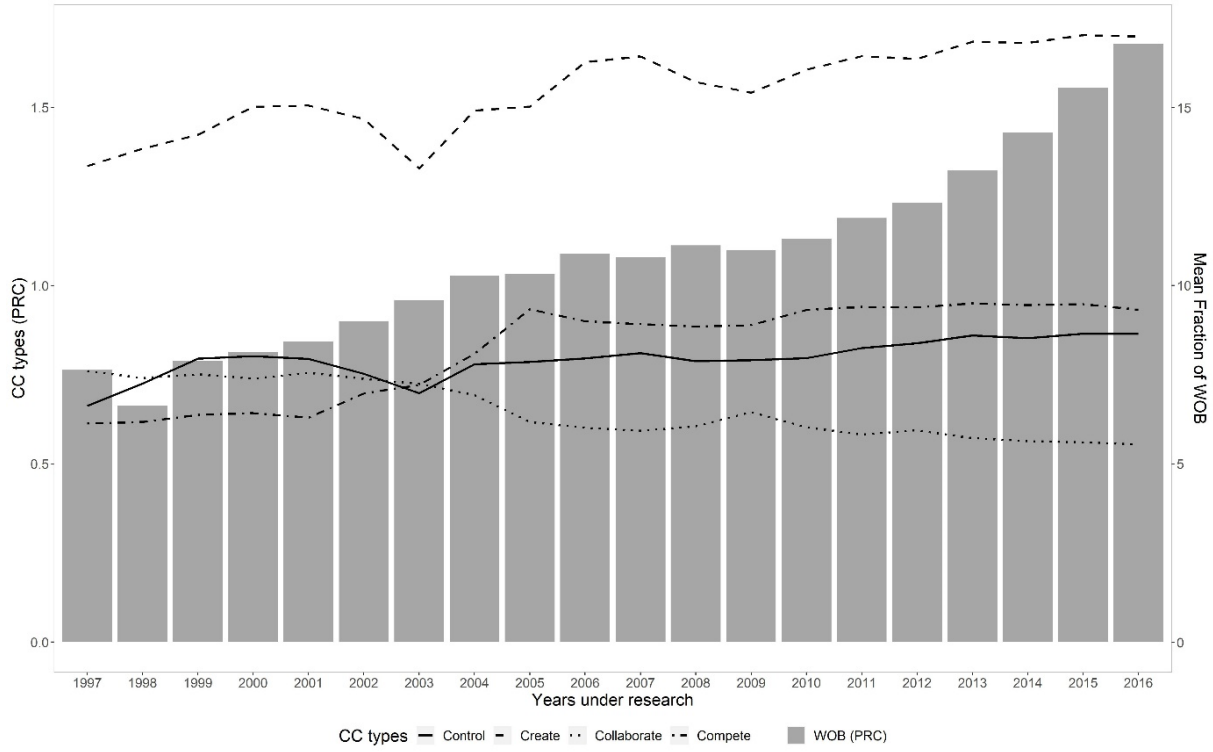

Table I. Variable Definition

Women on Board Variables	
WOB (PRC)	The percentage of women represented on the board.
WOB (D)	A dummy variable that takes the value of 1 if there is one or more women on board, and 0 otherwise.
Corporate Culture Variables	
COLLABORATE	The frequency of words relating to the collaborative corporate culture scaled by the total number of words in the 10-K filing.
CREATE	The frequency of words relating to the create corporate culture scaled by the total number of words in the 10-K filing.
COMPETE	The frequency of words relating to the compete corporate culture scaled by the total number of words in the 10-K filing.
CONTROL	The frequency of words relating to the control corporate culture scaled by the total number of words in the 10-K filing.
Firm, Board & 10-K Control Variables	
SIZE	The natural logarithm of total assets.
YOUNG FIRM	Set equal to 1 if the firm age is 5 years or smaller, and 0 otherwise. Firm age is measured as the number of years that the firm is covered in the COMPUSTAT universe.
INDEP DIRECTORS (PRC)	The percentage of independent directors.
EQUITY INSIDERS (PRC)	The percentage of board insiders with an equity share.
CEO/CHAIR (D)	A dummy variable that takes the value of 1 if the CEO holds also the Chair of the board, and 0 otherwise.
BOARD SIZE	Number of Board Members.
FEMALE EXEC (PRC)	The percentage of female executives in top management.
POSITIVE TONE	The percentage of words in the 10-K with positive tone (following the Loughran and McDonald (2011) dictionary).
NEGATIVE TONE	The percentage of words in the 10-K with negative tone (following the Loughran and McDonald (2011) dictionary).
FILING SIZE	The natural logarithm of 10-K file size.

Table II. Descriptive Statistics

Statistic	N	Mean	St. Dev.	Pctl(25)	Median	Pctl(75)
WOB (PRC)	18,160	0.110	0.101	0	0.1	0.2
WOB (D)	18,160	0.659	0.474	0	1	1
Collaborate (lag1)	18,160	0.658	0.484	0.363	0.542	0.812
Create (lag1)	18,160	0.792	0.576	0.394	0.658	1.039
Compete (lag1)	18,160	1.539	0.769	1.002	1.436	1.948
Control (lag1)	18,160	0.817	0.382	0.570	0.779	1.007
Size	18,160	7.498	1.506	6.401	7.336	8.450
Young firm	18,160	0.012	0.110	0	0	0
Indep Directors (PRC)	18,160	0.727	0.158	0.625	0.750	0.857
Equity insiders (PRC)	18,160	0.170	0.102	0.1	0.1	0.2
CEO/Chair (D)	18,160	0.567	0.495	0	1	1
Board size	18,160	8.969	2.239	7	9	10
Female Exec (PRC)	18,160	0.070	0.117	0	0	0.2
Positive tone (lag1)	18,160	7.203	1.732	5.994	7.040	8.177
Negative tone (lag1)	18,160	15.468	4.277	12.722	15.455	18.140
Filing size (lag1)	18,160	10.588	0.590	10.235	10.593	10.954

Note: This table reports the summary statistics for sample firms for the period 1997-2016. The definitions of all variables are provided in Table I.

Table III. Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) WOB(PRC)													
(2) WOB(D)	0.783***												
(3) Collaborate(lag1)	0.041***	0.064***											
(4) Create(lag1)	-0.037***	-0.079***	-0.113***										
(5) Compete(lag1)	-0.031***	-0.086***	-0.137***	0.483***									
(6) Control(lag1)	0.045***	0.017**	-0.097***	0.129***	0.185***								
(7) Collaborate(lag2)	0.042***	0.072***	0.493***	-0.052***	-0.064***	-0.037***							
(8) Create(lag2)	-0.042***	-0.085***	-0.041***	0.783***	0.357***	0.067***	-0.116***						
(9) Compete(lag2)	-0.035***	-0.089***	-0.051***	0.345***	0.604***	0.107***	-0.135***	0.495***					
(10) Control(lag2)	0.043***	0.017**	-0.030***	0.064***	0.109***	0.572***	-0.096***	0.123***	0.173***				
(11) Collaborate(lag3)	0.047***	0.078***	0.461***	-0.048***	-0.057***	-0.032***	0.482***	-0.052***	-0.057***	-0.037***			
(12) Create(lag3)	-0.050***	-0.092***	-0.046***	0.720***	0.336***	0.051***	-0.044***	0.774***	0.347***	0.063***	-0.117***		
(13) Compete(lag3)	-0.039***	-0.090***	-0.047***	0.323***	0.550***	0.094***	-0.056***	0.349***	0.595***	0.106***	-0.133***	0.490***	
(14) Control(lag3)	0.034***	0.011	-0.031***	0.060***	0.099***	0.513***	-0.023**	0.060***	0.096***	0.576***	-0.093***	0.114***	0.159***

Note: This table reports correlations between the main variable for sample firms for the period 1997-2016. The definitions of all variables are provided in Table I.

*p<0.1; **p<0.05; ***p<0.01

Table IV. Quantile Analysis: Mean board gender diversity

	Collaborate (lag 3)		Create (lag 3)		Compete (lag 3)		Control (lag 3)	
	WOB(PRC)	WOB(D)	WOB(PRC)	WOB(D)	WOB(PRC)	WOB(D)	WOB(PRC)	WOB(D)
Low	0.096	0.580	0.118	0.714	0.119	0.722	0.121	0.720
2	0.105	0.643	0.117	0.718	0.114	0.700	0.115	0.683
3	0.114	0.679	0.115	0.687	0.117	0.701	0.108	0.655
4	0.120	0.709	0.109	0.651	0.111	0.659	0.108	0.651
High	0.124	0.746	0.101	0.587	0.098	0.575	0.107	0.649
High-Low	0.028 ***	0.166 ***	-0.017 ***	-0.127 ***	-0.021 ***	-0.147 ***	-0.014 ***	-0.071 ***
t_stat	(11.63)	(14.68)	(6.88)	(11.08)	(8.48)	(12.90)	(5.62)	(6.32)

Note: This table reports ranked summary statistics for the relation between corporate culture and women on board for the period 1997-2016. The firm-year observations of the main variables WOB (PRC) and WOB (D) are allocated into five portfolios, which are created yearly for each corporate culture separately (using the three period lagged values of the corporate cultures). The bottom lines feature the overall difference between the HIGH and LOW portfolios with the associated t-test values. The definitions of all variables are provided in Table I.
*p<0.1; **p<0.05; ***p<0.01

Table V. Determinants of board gender diversity: the proportion of women on the Board of Directors; OLS

	Dependent variable: WOB(PRC)					
	(1)	(2)	(3)	(4)	(5)	(6)
	(lag 1)	(lag 2)	(lag 3)	(lag 1)	(lag 2)	(lag 3)
Collaborate (lag)	0.051***	0.048***	0.051***	0.028**	0.025*	0.023*
	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)	(0.014)
Create (lag)	0.003	−0.003	−0.012	0.010	0.006	−0.001
	(0.020)	(0.021)	(0.020)	(0.019)	(0.020)	(0.020)
Compete (lag)	−0.055***	−0.056***	−0.055***	−0.029*	−0.030*	−0.023
	(0.020)	(0.020)	(0.019)	(0.017)	(0.017)	(0.016)
Control (lag)	−0.022*	−0.021	−0.024*	−0.014	−0.015	−0.015
	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)
Size				0.257***	0.259***	0.259***
				(0.018)	(0.018)	(0.018)
Young firm				0.014	0.014	0.007
				(0.008)	(0.011)	(0.019)
Indep Directors (PRC)				0.168***	0.170***	0.170***
				(0.017)	(0.018)	(0.018)
Equity insiders (PRC)				−0.040*	−0.039*	−0.040*
				(0.021)	(0.021)	(0.022)
CEO/Chair (D)				0.060**	0.058**	0.057*
				(0.028)	(0.028)	(0.029)
Positive tone (lag)				0.025***	0.045***	0.040**
				(0.010)	(0.017)	(0.017)
Negative tone (lag)				−0.003	−0.006	−0.009
				(0.004)	(0.017)	(0.017)
Filing size (lag)				0.005	0.004	0.016
				(0.030)	(0.017)	(0.018)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,160	17,705	17,011	18,160	17,705	17,011
R^2	0.175	0.174	0.173	0.283	0.283	0.282
Adjusted R^2	0.172	0.170	0.169	0.280	0.279	0.278

Note: This table reports regression results using data covering the years 1997-2016. The dependent variable in all models is the percentage of women on board WOB(PRC). These models are estimated with the OLS regression using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. Regression coefficients' t-statistics are reported in parentheses. Models (1) and (1') use CC type measures and lagged control variables at *t-1*, models (4) and (5) at *t-2*, and models (3) and (6) at *t-3*. Regression models (1)-(3) include a constantand and are estimated with fixed effects (year and industry dummies), while regression models (4)-(6) include a constant and are estimated with control variables and fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Table VI. Determinants of board gender diversity: the proportion of women on the Board of Directors; OLS

	Dependent variable: WOB(D)					
	(1)	(2)	(3)	(4)	(5)	(6)
	(lag 1)	(lag 2)	(lag 3)	(lag 1)	(lag 2)	(lag 3)
Collaborate (lag)	0.028***	0.031***	0.033***	0.018***	0.021***	0.020***
	(0.007)	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)
Create (lag)	−0.013	−0.016	−0.019*	−0.007	−0.008	−0.011
	(0.010)	(0.010)	(0.010)	(0.009)	(0.010)	(0.009)
Compete (lag)	−0.037***	−0.036***	−0.034***	−0.020***	−0.020***	−0.017**
	(0.008)	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
Control (lag)	−0.009	−0.006	−0.007	−0.004	−0.002	−0.003
	(0.007)	(0.007)	(0.007)	(0.006)	(0.006)	(0.005)
Size				0.154***	0.154***	0.152***
				(0.008)	(0.008)	(0.008)
Young firm				0.0001	−0.002	−0.002
				(0.004)	(0.005)	(0.010)
Indep Directors (PRC)				0.064***	0.064***	0.062***
				(0.008)	(0.009)	(0.009)
Equity insiders (PRC)				−0.042***	−0.043***	−0.045***
				(0.009)	(0.010)	(0.010)
CEO/Chair (D)				−0.001	−0.003	−0.002
				(0.013)	(0.014)	(0.014)
Positive tone (lag)				0.009**	0.014**	0.013*
				(0.004)	(0.007)	(0.007)
Negative tone (lag)				−0.003	−0.010	−0.009
				(0.002)	(0.008)	(0.008)
Filing size (lag)				−0.005	−0.003	−0.002
				(0.014)	(0.008)	(0.008)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,160	17,705	17,011	18,160	17,705	17,011
R^2	0.112	0.111	0.109	0.256	0.254	0.251
Adjusted R^2	0.109	0.107	0.105	0.253	0.251	0.247

Note: This table reports regression results using data covering the years 1997-2016. The dependent variable in all models is the dummy variable that takes the value of 1 if there is one or more women on board, and 0 otherwise WOB(D). These models are estimated with the OLS regression using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. Regression coefficients' t-statistics are reported in parentheses. Models (1) and (4) use CC type measures and lagged control variables at *t-1*, models (2) and (5) at *t-2*, and models (3) and (6) at *t-3*. Regression models (1)-(3) include a constantand and are estimated with fixed effects (year and industry dummies), while regression models (4)-(6) include a constant and are estimated with control variables and fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Table VII. Determinants of board gender diversity: women's presence on the Board of Directors; Logit

	Dependent variable: WOB(D)					
	(1)	(2)	(3)	(4)	(5)	(6)
	(lag 1)	(lag 2)	(lag 3)	(lag 1)	(lag 2)	(lag 3)
Collaborate (lag)	0.159***	0.180***	0.193***	0.119***	0.139***	0.135***
	(0.040)	(0.040)	(0.042)	(0.040)	(0.041)	(0.042)
Create (lag)	−0.055	−0.069	−0.084*	−0.029	−0.037	−0.052
	(0.047)	(0.048)	(0.048)	(0.055)	(0.058)	(0.055)
Compete (lag)	−0.180***	−0.177***	−0.168***	−0.122***	−0.123***	−0.105**
	(0.040)	(0.040)	(0.040)	(0.045)	(0.045)	(0.045)
Control (lag)	−0.045	−0.034	−0.036	−0.015	−0.007	−0.011
	(0.034)	(0.033)	(0.034)	(0.038)	(0.039)	(0.037)
Size				1.019***	1.024***	1.025***
				(0.058)	(0.058)	(0.060)
Young firm				0.001	−0.007	−0.013
				(0.021)	(0.029)	(0.067)
Indep Directors (PRC)				0.373***	0.373***	0.363***
				(0.049)	(0.051)	(0.053)
Equity insiders (PRC)				−0.235***	−0.238***	−0.250***
				(0.054)	(0.055)	(0.057)
CEO/Chair (D)				0.032	0.022	0.024
				(0.079)	(0.080)	(0.082)
Positive tone (lag)				0.067**	0.109**	0.101**
				(0.027)	(0.047)	(0.047)
Negative tone (lag)				−0.011	−0.028	−0.027
				(0.011)	(0.047)	(0.047)
Filing size (lag)				−0.071	−0.048	−0.038
				(0.086)	(0.051)	(0.052)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,160	17,705	17,011	18,160	17,705	17,011
Pseudo R^2	0.157	0.199	0.265	0.362	0.442	0.442

Note: This table reports regression results using data covering the years 1997-2016. The dependent variable in all models is the dummy variable that takes the value of 1 if there is one or more women on board, and 0 otherwise WOB(D). These models are estimated with logistic regression using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms, with the Chi-square statistics reported in parentheses. Models (1) and (4) use CC type measures and lagged control variables at *t-1*, models (2) and (5) at *t-2*, and models (3) and (6) at *t-3*. Regression models (1)-(3) include a constant and and are estimated with fixed effects (year and industry dummies), while regression models (4)-(6) include a constant and are estimated with control variables and fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Table VIII. Determinants of board gender diversity: controlling for the share of female executives

	Dependent variable: WOB(D)			
	(1)	(2)	(3)	(4)
Collaborate (lag 1)	0.017***	0.017***	0.111***	0.114***
	(0.040)	(0.041)	(0.022)	(0.022)
Create (lag 1)	−0.009	−0.008	−0.045*	−0.038
	(0.057)	(0.056)	(0.025)	(0.024)
Compete (lag 1)	−0.020**	−0.020***	−0.116***	−0.120***
	(0.046)	(0.045)	(0.025)	(0.024)
Control (lag 1)	−0.003	−0.004	−0.009	−0.012
	(0.038)	(0.038)	(0.022)	(0.022)
Female execs (lag 1)	0.034***		0.230***	
	(0.040)		(0.021)	
Female execs (lead 1)		0.038***		0.253***
		(0.042)		(0.021)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	17,833	17,914	17,833	17,914
R^2	0.261	0.262		
Adjusted R^2	0.258	0.259		
Pseudo R^2			0.394	0.387

Note: This table reports regression results using data covering the years 1997-2016. The dependent variable in all models is the dummy variable that takes the value of 1 if there is one or more women on board, and 0 otherwise WOB(D). Models (1)-(2) are estimated with the OLS regression, with the coefficients' t-statistics reported in parentheses. Models (3)-(4) are estimated with logistic regression, with the Chi-square statistics reported in parentheses. All models are estimated using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. Regression models include a constant and are estimated with control variables and fixed effects (year and industry dummies). Additinally, we control for the female executives.
*p<0.1; **p<0.05; ***p<0.01

Table IX. Changes in CC preceding changes in WOB: Robustness for reverse causality

	Dependent variable:				
	Δ WOB (between t and t-1)				
	(1)	(2)	(3)	(4)	(5)
Δ Collaborate (D)	0.010**				0.012***
	(0.004)				(0.005)
Δ Create(D)		0.007			0.004
		(0.006)			(0.007)
Δ Compete (D)			0.006*		0.006*
			(0.003)		(0.004)
Δ Control (D)				0.007	0.007
				(0.006)	(0.006)
Controls	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	17,704	17,704	17,704	17,704	17,704
R^2	0.065	0.065	0.065	0.065	0.066
Adjusted R^2	0.061	0.061	0.061	0.061	0.061

Note: This table reports regression results using data covering the years 1997-2016. The dependent variable is the contemporary change in woman's representation on the BoD, while explanatory variables are preceding changes in the levels of each CC type. These models are estimated with OLS regression using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms, with the t-statistics reported in parentheses. Regression models include a constant and are estimated with control variables and fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Table X. Gender Diversity Effect on the Corporate Culture: Robustness for reverse causality using static measure of woman representation on the BoD and intemporal change in the woman's representation on the BoD

	Dependent variable:			
	(1)	(2)	(3)	(4)
	Collaborate	Create	Compete	Control
Panel A: Controlling for the presence of women on the BoD				
CC type (lag1)	0.266***	0.451***	0.311***	0.319***
	(0.018)	(0.033)	(0.018)	(0.020)
CC type (lag2)	0.184***	0.217***	0.185***	0.196***
	(0.015)	(0.027)	(0.011)	(0.015)
CC type (lag3)	0.162***	0.116***	0.142***	0.138***
	(0.014)	(0.010)	(0.011)	(0.025)
WOB (D)	0.004	−0.0003	−0.025	0.004
	(0.017)	(0.012)	(0.015)	(0.014)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	17,011	17,011	17,011	17,011
R^2	0.427	0.712	0.568	0.489
Adjusted R^2	0.425	0.710	0.566	0.487
	Δ Collaborate (D)	Δ Create (D)	Δ Compete (D)	Δ Control (D)
Panel B: Controlling for the changes in woman's proportion on the BoD				
CC type (lag1)	−0.210***	0.250***	0.264***	0.227***
	(0.009)	(0.025)	(0.011)	(0.012)
CC type (lag2)	0.035***	−0.078***	−0.050***	−0.042***
	(0.006)	(0.010)	(0.005)	(0.006)
CC type (lag3)	0.041***	−0.057***	−0.053***	−0.044***
	(0.005)	(0.012)	(0.004)	(0.010)
Delta WOB	−0.018	−0.001	−0.008	−0.002
	(0.011)	(0.011)	(0.011)	(0.011)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	17,010	17,010	17,010	17,010
R^2	0.152	0.153	0.221	0.184
Adjusted R^2	0.148	0.149	0.217	0.180

Note: This table reports regression results using data covering the years 1997-2016. The dependent variable is the contemporary level of each CC type, while explanatory variables are the levels of each CC type lagged by one, two and three period. Additional independent variable is the dummy variable that takes the value of 1 if there is one or more women on board, and 0 otherwise WOB(D) in Panel A, and an intemporal change in women on board in Panel B. These models are estimated with OLS regression using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. Regression coefficients' t-statistics are reported in parentheses. Regression models include a constant and are estimated with control variables and fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Table XI. Gender Diversity Effect on the Corporate Culture: Critical mass theory robustness check for reverse causality

	Dependent variable: Increase/Decrease in			
	(1)	(2)	(3)	(4)
	Collaborate (D)	Create (D)	Compete (D)	Control (D)
Panel A: In firm-year boards with 3 or more female directors				
CC type (lag1)	-0.215^{***}	0.311^{***}	0.221^{***}	0.244^{***}
	(0.021)	(0.027)	(0.061)	(0.023)
CC type (lag2)	0.024	-0.084^{***}	-0.046^{***}	-0.032^{*}
	(0.016)	(0.025)	(0.017)	(0.018)
CC type (lag3)	0.054^{***}	-0.043^{*}	-0.065^{***}	-0.030
	(0.016)	(0.025)	(0.015)	(0.020)
Increase in WOB (D)	-0.011	-0.057^{**}	-0.064^{**}	-0.015
	(0.028)	(0.029)	(0.031)	(0.030)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	1,368	1,368	1,368	1,368
R^2	0.211	0.226	0.200	0.250
Adjusted R^2	0.168	0.184	0.156	0.209
Panel B: In firm-year boards with less than 3 female directors				
CC type (lag1)	-0.210^{***}	0.247^{***}	0.269^{***}	0.227^{***}
	(0.010)	(0.026)	(0.007)	(0.013)
CC type (lag2)	0.036^{***}	-0.078^{***}	-0.050^{***}	-0.043^{***}
	(0.006)	(0.010)	(0.005)	(0.006)
CC type (lag3)	0.039^{***}	-0.058^{***}	-0.051^{***}	-0.044^{***}
	(0.006)	(0.012)	(0.005)	(0.011)
Increase in WOB (D)	-0.018	0.006	0.003	0.003
	(0.013)	(0.012)	(0.012)	(0.012)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	15,642	15,642	15,642	15,642
R^2	0.150	0.151	0.227	0.182
Adjusted R^2	0.146	0.147	0.223	0.177

Note: This table reports regression results using data covering the years 1997-2016. The dependent variable is a dummy that takes the value of 1 if there is a contemporary increase in the level of each CC type, and 0 otherwise. Explanatory variables are the levels of each CC type lagged by one, two and three period. An additional independent variable is the percent of female directors. These models are estimated with the OLS regression using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. Regression coefficients' t-statistics are reported in parentheses. Regression models include a constant and are estimated with control variables and fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Table XII. Tokenism: Quantile analysis

	Collaborate (lag 1)	Create (lag 1)	Compete (lag 1)	Control (lag 1)
	WOB(number)	WOB(number)	WOB(number)	WOB(number)
Low	1.558	1.626	1.623	1.659
2	1.588	1.629	1.626	1.633
3	1.629	1.610	1.631	1.608
4	1.655	1.613	1.631	1.599
High	1.650	1.603	1.569	1.582
High-Low	0.092 ***	-0.024	-0.054 **	-0.077 ***
t_stat	(3.74)	(0.93)	(2.16)	(3.03)

Note: This table reports ranked summary statistics for the relation between corporate culture and women on board for the period 1997-2016. WOB(number) is the number of women appointed to the BoD, conditional on at least 1 female director being on the board already. The firm-year observations of the variable WOB(number) are allocated into five portfolios, which are created yearly for each corporate culture separately (using the one period lagged values of each corporate culture). The bottom lines feature the overall difference between the HIGH and LOW portfolios with the associated t-test values. *p<0.1; **p<0.05; ***p<0.01

Table XIII. Tokenism: Multivariate analysis

	Dependent variable:				
	Pr(Δ WOB (number) >0)				
	(1)	(2)	(3)	(4)	(5)
	Neutral	Women-hostile	Women-friendly	Women-hostile	Women-friendly
	All sample	COLL LOW	COLL HIGH	COLL LOW	COLL HIGH
				COMP HIGH	COMP LOW
Token: 1 WOB (lag)	−0.092***	−0.121***	−0.075***	−0.111***	−0.073***
	(0.007)	(0.016)	(0.014)	(0.015)	(0.013)
Token: 2 WOB (lag)	−0.184***	−0.209***	−0.154***	−0.198***	−0.165***
	(0.010)	(0.021)	(0.019)	(0.018)	(0.017)
Token: >2 WOB (lag)	−0.234***	−0.280***	−0.191***	−0.265***	−0.198***
	(0.014)	(0.026)	(0.029)	(0.023)	(0.028)
Controls	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	16,095	3,226	3,223	4,470	4,470
R^2	0.072	0.106	0.088	0.085	0.076
Adjusted R^2	0.068	0.085	0.068	0.069	0.062

Note: Pr(Δ WOB (number) >0) is a dummy that takes a value of 1 if there was an increase in the number of female directors between *t* and *t-1*. All models measure the probability of appointing one more woman on the BoD. Model (1) uses the whole sample. Model (2) and (3) is run on the subsamples of companies that in quintiles score lowest and highest on COLLABORATE culture, called 'women-hostile' and 'women-friendly' respectively. Model (4) is run on the subsample of companies that score low on COLLABORATE culture and high on COMPETE culture (divided by median), thus they are classified as 'women-hostile'. Model (5) is run on the subsample of companies that score high on COLLABORATE culture and low on COMPETE culture (divided by median), thus they are classified as 'women-friendly'. Key explanatory variables are key variables are the indicators (tokens) for having one, two, or more than two women on the BoD already. These models are estimated with an OLS regression using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. Regression coefficients' t-statistics are reported in parentheses.Regression models include a constant and are estimated with control variables and fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Appendix A. Dictionaries for CC types

Table A1. Corporate culture types derivation

Corporate Culture
A (Collaborate) coaching, commitment, consensus*, cooperatively, counsel*, foster*, impartial*, integrity, mentor*, nurture*, openness, participate*, teamwork, train*, transparent*, trustworthy
B (Create) advancements, brand-new, breakthrough, contemporary*, cuttingedge, designer*, develop*, dynamic*, entrepreneurial*, flexible*, forefront, groundbreaking*, innovate*, invent*, launch*, leading-edge, modernize*, avant-garde, novel, opportunity*, originally, pioneered*, progression*, spearheaded*, state-of-theart, talent*, trend-setter*, ultra-modern, create*, unique*
C (Compete) accomplish*, achieve*, aggressive*, ambitious*, compete*, cutthroat*, dominant*, energetically, goal*, outdo, outshine*, rival*, strive*, succeed*, surpass*, target*, vigorously, vying, win*, zealously
D (Control) competency, controllable*, coordinate*, curb, dependable*, efficient*, methodical*, obey*, orderly, organize*, oversee*, policy*, protocol*, reliable*, rigidly, solidity, stability, steadfast*, structure*, superintend*, supervise*, systematic*, unbending

Wordlist

A (Collaborate)

coaching = [coaching]
commitment = [commitment]
consensus* = [consensual, consensus, consensuses]
cooperatively = [cooperatively]
counsel* = [counsel, counseled, counseling, counsels]
foster* = [fostered, fostering, fosters]
impartial* = [impartial, impartiality, impartially]
integrity = [integrity]
mentor* = [mentored, mentoring, mentors, mentorship]

nurture* = [nurture, nurtured, nurtures, nurturing]
openness = [openness]
participate* = [participate, participated, participates, participating, participation]
teamwork = [teamwork]
train* = [train, training]
transparent* = [transparency, transparent, transparently]
trustworthy = [trustworthy]

B (Create)

advancements = [advancements]
avant-garde = [avant-garde]
brand-new = [brand-new]
breakthrough = [breakthrough]
contemporary* = [contemporary, contemporize, contemporized, contemporizing]
create* = [create, creates, creating, creative, creatively, creativeness, creatively, creator, creators]
cutting-edge = [cutting-edge]
designer* = [designer, designers, designs]
develop* = [develop, developed, developing, developmentally, develops, developments]
dynamic* = [dynamic, dynamically]
entrepreneurial* = [entrepreneurial, entrepreneurism]
flexible* = [flexible, flexibly]
forefront = [forefront]
ground-breaking* = [ground-breaking, groundbreaking]
innovate* = [innovate, innovated, innovating, innovation, innovational, innovative, innovatively, innovativeness, innovators, innovator]
invent* = [invent, invented, inventing, invention, inventions, inventive, inventively, inventiveness, inventor, inventors, invents]
launch* = [launch, launched, launches, launching]
leading-edge = [leading-edge]
modernize* = [modernist, modernization, modernize, modernized, modernizing]
novel = [novel]
opportunity* = [opportunity, opportunistic]
originally = [originally]
pioneered* = [pioneered, pioneering, pioneers]
progression* = [progression, progressive]
spearheaded* = [spearheaded, spearheading, spearheads]
state-of-the-art = [state-of-the-art]
talent* = [talent, talented, talents]
trend-setter* = [trend-setter, trend-setting, trendsetter, trendsetting]

ultra-modern = [ultra-modern]
unique* = [unique, uniquely, uniqueness]

C (Compete)

ccomplish* = [accomplish, accomplishable, accomplished, accomplishes, accomplishing, accomplishment, accomplishments]
achieve* = [achieve, achieved, achievement, achievements, achieves, achieving]
aggressive* = [aggressive, aggressively, aggressiveness]
ambitious* = [ambitious, ambitiously]
compete* = [compete, competed, competes, competing, competition, competitive, competitively, competitiveness, competitor, competitors]
cut-throat* = [cut-throat, cutthroat]
dominant* = [dominant, dominate, dominated, dominates, dominating]
energetically = [energetically]
goal* = [goal, goals]
outdo = [outdo]
outshine* = [outshine, outshines]
rival* = [rival, rivaled, rivaling, rivalry, rivals]
strive* = [strive, strives, striving]
succeed* = [succeed, success, successful, successfully]
surpass* = [surpass, surpassed, surpasses, surpassing]
target* = [target, targeted, targeting, targets]
vigorously = [vigorously]
vying = [vying]
win* = [win, winning, wins, won]
zealously = [zealously]

D (Control)

competency = [competency]
controllable* = [controllable, controlling]
coordinate* = [coordinate, coordinated, coordinates, coordinating, coordination]
curb = [curb]
dependable* = [dependable, dependably]
efficient* = [efficiencies, efficiency, efficient, efficiently]
methodical* = [methodical, methodically]
obey* = [obey, obeyed, obeying, obeys]
orderly = [orderly]
organize* = [organize, organizes, organizing]

oversee* = [oversaw, oversee, overseeing, overseen, oversees]
policy* = [policy, policies]
protocol* = [protocol, protocols]
reliable* = [reliability, reliable, reliably]
rigidly = [rigidly]
solidity = [solidity]
stability = [stability]
steadfast* = [steadfast, steadfastly, steadfastness]
structure* = [structure, structurally]
superintend* = [superintend, superintendent, superintendents, superintending]
supervise* = [supervise, supervised, supervises, supervising, supervision, supervisor, supervisors, supervisory]
systematic* = [systematic, systematically, systematization, systematize, systematized, systematizing]
unbending = [unbending]

Appendix B. Additional Results

Table B1. Determinants of board gender diversity: univariate regression results, OLS

	Dependent variable: WOB			
	(1)	(2)	(3)	(4)
Panel A: Fixed effects model with WOB(PRC) as dependent variable				
Collaborate (lag 1)	0.057***			
	(0.014)			
Create (lag 1)		−0.029*		
		(0.017)		
Compete (lag 1)			−0.063***	
			(0.017)	
Control (lag 1)				−0.034***
				(0.013)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	18,160	18,160	18,160	18,160
R^2	0.172	0.170	0.173	0.170
Adjusted R^2	0.169	0.167	0.170	0.167
Panel B: Fixed effects model with WOB(D) as dependent variable				
Collaborate (lag 1)	0.034***			
	(0.007)			
Create (lag 1)		−0.033***		
		(0.009)		
Compete (lag 1)			−0.046***	
			(0.007)	
Control (lag 1)				−0.018**
				(0.007)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	18,160	18,160	18,160	18,160
R^2	0.104	0.103	0.108	0.101
Adjusted R^2	0.101	0.100	0.105	0.098

Note: This table reports univariate regression results using data covering the years 1997-2016. The dependent variable in Panel A models (1)-(4) is the percentage of women on board WOB (PRC). The dependent variable in Panel B models (1)-(4) is the dummy variable that takes the value of 1 if there is one or more women on board, and 0 otherwise, WOB (D). All models are estimated with OLS method, robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. Regression coefficients' t-statistics are reported in parentheses. All regression models include a constant and are estimated with fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Table B2. Determinants of board gender diversity: univariate regression results, logit

	Dependent variable: WOB			
	(1)	(2)	(3)	(4)
Fixed effects model with WOB(D) as dependent variable				
Collaborate (lag 1)	0.186^{***}			
	(0.042)			
Create (lag 1)		-0.155^{***}		
		(0.045)		
Compete (lag 1)			-0.224^{***}	
			(0.036)	
Control (lag 1)				-0.091^{**}
				(0.035)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	18,160	18,160	18,160	18,160
Pseudo R^2	0.147	0.145	0.151	0.142

Note: This table reports univariate regression results using data covering the years 1997-2016. The dependent variable in models (1)-(4) is the dummy variable that takes the value of 1 if there is one or more women on board, and 0 otherwise, WOB(D). These models are estimated with logistic regression with the Chi-square statistics reported in parentheses, using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms. All regression models include a constant and are estimated with fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01

Table B3. Gender Diversity Effect on the Corporate Culture: Robustness for reverse causality using intertemporal changes in the woman's representation on the BoD; Logit

	Dependent variable: Increase/Decrease in			
	Collaborate (D)	Create(D)	Compete (D)	Control (D)
Panel A: Controlling for the change in woman's proportion on the BoD				
CC type (lag1)	−1.530***	1.584***	1.721***	1.578***
	(0.060)	(0.060)	(0.043)	(0.043)
CC type (lag2)	0.258***	−0.530***	−0.381***	−0.346***
	(0.027)	(0.041)	(0.031)	(0.031)
CC type (lag3)	0.261***	−0.356***	−0.359***	−0.287***
	(0.028)	(0.041)	(0.027)	(0.027)
Delta WOB(PRC)	−0.087	0.001	−0.051	−0.011
		(0.053)	(0.057)	(0.057)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	17,010	17,010	17,010	17,010
Pseudo R^2	0.334	0.319	0.402	0.367
Panel B: Controlling for the increase of woman's presence on the BoD				
CC type (lag1)	−1.534***	1.596***	1.720***	1.587***
	(0.063)	(0.063)	(0.046)	(0.046)
CC type (lag2)	0.260***	−0.519***	−0.375***	−0.332***
	(0.029)	(0.042)	(0.034)	(0.034)
CC type (lag3)	0.253***	−0.372***	−0.362***	−0.316***
	(0.029)	(0.036)	(0.029)	(0.029)
Increase in WOB(D)	−0.067	−0.012	0.039	−0.074
	(0.057)	(0.056)	(0.062)	(0.062)
Controls	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Observations	15,509	15,509	15,509	15,509
Pseudo R^2	0.444	0.431	0.5	0.473

Note: This table reports regression results using data covering the years 1997-2016. The dependent variable is a dummy that takes the value of 1 if there is a contemporary increase in the level of each CC type, and 0 otherwise. Explanatory variables are the levels of each CC type lagged by one, two and three periods. Additional independent variable is a dummy that takes a value of 1 if there is an increase in the proportion (Panel A) or in the number (Panel B) of female directors, and 0 otherwise. These models are estimated with logistic regression using robust standard errors corrected for autocorrelation and heteroscedasticity and clustered across firms, with the Chi-square statistics reported in parentheses. Regression models include a constant and are estimated with control variables and fixed effects (year and industry dummies).
*p<0.1; **p<0.05; ***p<0.01